Name: Date:

Polynomial Factoring solution (version 630)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 4x + 12 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(12)}}{2(1)}$$

$$x = \frac{-(-4) \pm \sqrt{16 - 48}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{-32}}{2}$$

$$x = \frac{4 \pm \sqrt{-16 \cdot 2}}{2}$$

$$x = \frac{4 \pm 4\sqrt{2}\, i}{2}$$

$$x = 2 \pm 2\sqrt{2}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $4 + 5i$ and $7 + 8i$ in standard form $(a + bi)$.**

Solution

$$(4 + 5i) \cdot (7 + 8i)$$

$$28 + 32i + 35i + 40i^2$$

$$28 + 32i + 35i - 40$$

$$28 - 40 + 32i + 35i$$

$$-12 + 67i$$

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3. **Write function $f(x) = x^3 - 3x^2 - 6x + 8$ in factored form. I'll give you a hint: one factor is $(x - 1)$.**

Solution

	1	-3	-6	8
1		1	-2	-8
	1	-2	-8	0

$$f(x) = (x-1)(x^2 - 2x - 8)$$

$$f(x) = (x-1)(x-4)(x+2)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x+4) \cdot (x+1)^2 \cdot (x-4) \cdot (x-8)^2$$

Sketch a graph of polynomial $y = p(x)$.